

ABSTRACT

A method is disclosed for measuring the dose and energy level of ion implants forming a shallow junction in a semiconductor sample. In the method, two independent measurements of the sample are made. The first measurement monitors the response of the sample to periodic excitation. In the illustrated embodiment, the modulated optical reflectivity of a reflected probe beam is monitored to provide information related to the generation of thermal and/or plasma waves in the sample. A second spectroscopic measurement is also performed. This measurement could be either a spectroscopic reflectometry measurement or a spectroscopic ellipsometry measurement. The data from the two measurements are combined in a manner to yield information about both the dose (concentration) of the dopants as well as the energy used to inject the dopants in the semiconductor lattice. The method will be useful in controlling the formation of shallow junctions.